AutomationDirect.com

User Manual

MDM-TEL

SELF-DIALING

Industrial Telephone Modem

Contents at a Glance

Section 1	Overview	5
Section 2	Performance Specifications	7
Section 3	Modem Mounting	8
Section 4	Electrical Connections	9
Section 5	Modem Configuration	12
Section 6	AT Command Summary	16
Section 7	S-Register Summary	20
Section 8	Maintenance Information	28
Section 9	Product Support and Additional Documents	29

c UL us LISTED

CE

Class I, Division 2,
Groups A, B, C, and D
Hazardous Locations

WARNING

Thank you for purchasing automation equipment from ***Automationdirect.com***™. We want your new automation equipment to operate safely. Anyone who installs or uses this equipment should read this publication (and any other relevant publications) before installing or operating the equipment.

To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and usually change with time. It is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation are in compliance with the latest revision of these codes.

At a minimum, you should follow all applicable sections of the National Fire Code, National Electrical Code, and the codes of the National Electrical Manufacturer's Association (NEMA). There may be local regulatory or government offices that can also help determine which codes and standards are necessary for safe installation and operation.

Equipment damage or serious injury to personnel can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation, or operation.

Our products are not fault-tolerant and are not designed, manufactured or intended for use or resale as on-line control equipment in hazardous environments requiring fail-safe performance, such as in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines, or weapons systems, in which the failure of the product could lead directly to death, personal injury, or severe physical or environmental damage ("High Risk Activities"). ***Automationdirect.com***™ specifically disclaims any expressed or implied warranty of fitness for High Risk Activities.

For additional warranty and safety information, see the Terms and Conditions section of our Desk Reference. If you have any questions concerning the installation or operation of this equipment, or if you need additional information, please call us at 770-844-4200.

This publication is based on information that was available at the time it was printed. At **Automationdirect.com**™ we constantly strive to improve our products and services, so we reserve the right to make changes to the products and/or publications at any time without notice and without any obligation. This publication may also discuss features that may not be available in certain revisions of the product.

TRADEMARKS

This publication may contain references to products produced and/or offered by other companies. The product and company names may be trademarked and are the sole property of their respective owners. ***Automationdirect.com***™ disclaims any proprietary interest in the marks and names of others.

Copyright 2014, *Automationdirect.com*™ Incorporated

All Rights Reserved

No part of this manual shall be copied, reproduced, or transmitted in any way without the prior, written consent of ***Automationdirect.com***™ Incorporated. ***Automationdirect.com***™ retains the exclusive rights to all information included in this document.

AVERTISSEMENT

Nous vous remercions d'avoir acheté l'équipement d'automatisation de ***Automationdirect.com***[MC] . Nous tenons à ce que votre nouvel équipement d'automatisation fonctionne en toute sécurité. Toute personne qui installe ou utilise cet équipement doit lire la présente publication (et toutes les autres publications pertinentes) avant de l'installer ou de l'utiliser.

Afin de réduire au minimum le risque d'éventuels problèmes de sécurité, vous devez respecter tous les codes locaux et nationaux applicables régissant l'installation et le fonctionnement de votre équipement. Ces codes diffèrent d'une région à l'autre et, habituellement, évoluent au fil du temps. Il vous incombe de déterminer les codes à respecter et de vous assurer que l'équipement, l'installation et le fonctionnement sont conformes aux exigences de la version la plus récente de ces codes.

Vous devez, à tout le moins, respecter toutes les sections applicables du Code national de prévention des incendies, du Code national de l'électricité et des codes de la National Electrical Manufacturer's Association (NEMA). Des organismes de réglementation ou des services gouvernementaux locaux peuvent également vous aider à déterminer les codes ainsi que les normes à respecter pour assurer une installation et un fonctionnement sûrs.

L'omission de respecter la totalité des codes et des normes applicables peut entraîner des dommages à l'équipement ou causer de graves blessures au personnel. Nous ne garantissons pas que les produits décrits dans cette publication conviennent à votre application particulière et nous n'assumons aucune responsabilité à l'égard de la conception, de l'installation ou du fonctionnement de votre produit.

Nos produits ne sont pas insensibles aux défaillances et ne sont ni conçus ni fabriqués pour l'utilisation ou la revente en tant qu'équipement de commande en ligne dans des environnements dangereux nécessitant une sécurité absolue, par exemple, l'exploitation d'installations nucléaires, les systèmes de navigation aérienne ou de communication, le contrôle de la circulation aérienne, les équipements de survie ou les systèmes d'armes, pour lesquels la défaillance du produit peut provoquer la mort, des blessures corporelles ou de graves dommages matériels ou environnementaux («activités à risque élevé»). La société ***Automationdirect.com***[MC] nie toute garantie expresse ou implicite d'aptitude à l'emploi en ce qui a trait aux activités à risque élevé.

Pour des renseignements additionnels touchant la garantie et la sécurité, veuillez consulter la section Modalités et conditions de notre documentation. Si vous avez des questions au sujet de l'installation ou du fonctionnement de cet équipement, ou encore si vous avez besoin de renseignements supplémentaires, n'hésitez pas à nous téléphoner au 770-844-4200.

Cette publication s'appuie sur l'information qui était disponible au moment de l'impression. À la société ***Automationdirect.com***[MC], nous nous efforçons constamment d'améliorer nos produits et services. C'est pourquoi nous nous réservons le droit d'apporter des modifications aux produits ou aux publications en tout temps, sans préavis ni quelque obligation que ce soit. La présente publication peut aussi porter sur des caractéristiques susceptibles de ne pas être offertes dans certaines versions révisées du produit.

MARQUES DE COMMERCE

La présente publication peut contenir des références à des produits fabriqués ou offerts par d'autres entreprises. Les désignations des produits et des entreprises peuvent être des marques de commerce et appartiennent exclusivement à leurs propriétaires respectifs. ***Automationdirect.com***[MC] nie tout intérêt dans les autres marques et désignations.

Copyright 2014, *Automationdirect.com*[MC] **Incorporated**

Tous droits réservés

Nulle partie de ce manuel ne doit être copiée, reproduite ou transmise de quelque façon que ce soit sans le consentement préalable écrit de la société ***Automationdirect.com***[MC] Incorporated. ***Automationdirect.com***[MC] conserve les droits exclusifs à l'égard de tous les renseignements contenus dans le présent document.

WARNING

All power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction.
"This Equipment is Suitable for Use in Class I, Division 2, Groups A, B, C, D or Non-Hazardous Locations Only".

WARNING – EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.

WARNING – EXPLOSION HAZARD – WHEN IN HAZARDOUS LOCATIONS, DISCONNECT POWER BEFORE REPLACING OR WIRING UNITS.

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

WARNING – EXPLOSION HAZARD – IN HAZARDOUS OR POTENTIALLY HAZARDOUS LOCATIONS, DO NOT SEPARATE ANY PART OF THE UNIT WHEN ENERGIZED. USE THE UNIT FOR INTERNAL CONNECTIONS ONLY.

AVERTISSEMENT

Tout pouvoir, le câblage d'entrée et de sortie (I/O) doivent être conformes aux méthodes de câblage de Classe I, Division 2 et conformément à l'autorité compétente.
"Cet équipement est adapté pour une utilisation en Classe1, Division 2, Groupes A, B, C et D ou endroits non-dangereux seulement ".

AVERTISSEMENT – RISQUE D'EXPLOSION – LA SUBSTITUTION DE TOUT COMPOSANT PEUT NUIRE À LA CONFORMITÉ DE CLASSE I, DIVISION 2.

AVERTISSEMENT – RISQUE D'EXPLOSION – LORSQUE DANS DES ENDROITS DANGEREUX, DÉBRANCHEZ LE CORDON D'ALIMENTATION AVANT DE REMPLACER OU DE BRANCHER LES MODULES.

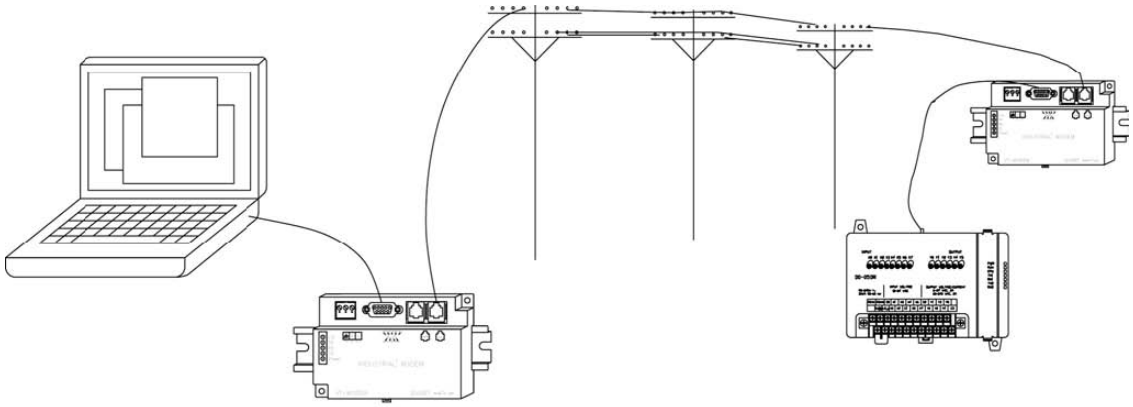
AVERTISSEMENT – RISQUE D'AVERTISSEMENT – NE DÉBRANCHEZ PAS L'ÉQUIPEMENT PENDANT QUE LE CIRCUIT EST DIRECT OU À MOINS QUE L'ENVIRONNEMENT SOIT CONNU POUR ÊTRE LIBRE DE CONCENTRATIONS INFLAMMABLES.

AVERTISSEMENT – RISQUE D'EXPLOSION – DANS LES ENDROITS DANGEREUX OU POTENTIELLEMENT DANGEREUX, NE PAS SEPARER UNE PARTIE DE L'UNITE SOUS TENSION. SEULEMENT UTILISEZ L'APPAREIL POUR LES CONNEXIONS INTERNES.

Section 1 Overview

This rugged industrial telephone modem has been designed for operation in electrical enclosures installed in harsh environments. This industrial modem supports all standard Hayes AT commands, Fax Class 1 and Class 2 commands and S-registers, and therefore can be set-up as an external modem on any PC. The industrial modem is compatible with any telecommunications or dial-up networking software.

The industrial modem allows easy access to PLCs, RTUs, I/O equipment, industrial computers, remote weather stations, pagers, and many other devices via standard analog PSTN-provided dial-up telephone connections. The modem may be DIN-rail or panel mounted, adjacent to other DIN-rail components, inside of new or existing enclosures. Most Windows software can communicate through the industrial modem, to perform file transfers, diagnostics, program debugging and many other operations.



The industrial modem allows communication to remote sites for data retrieval or diagnostics.

Note: The modem communicates over analog phone lines only.

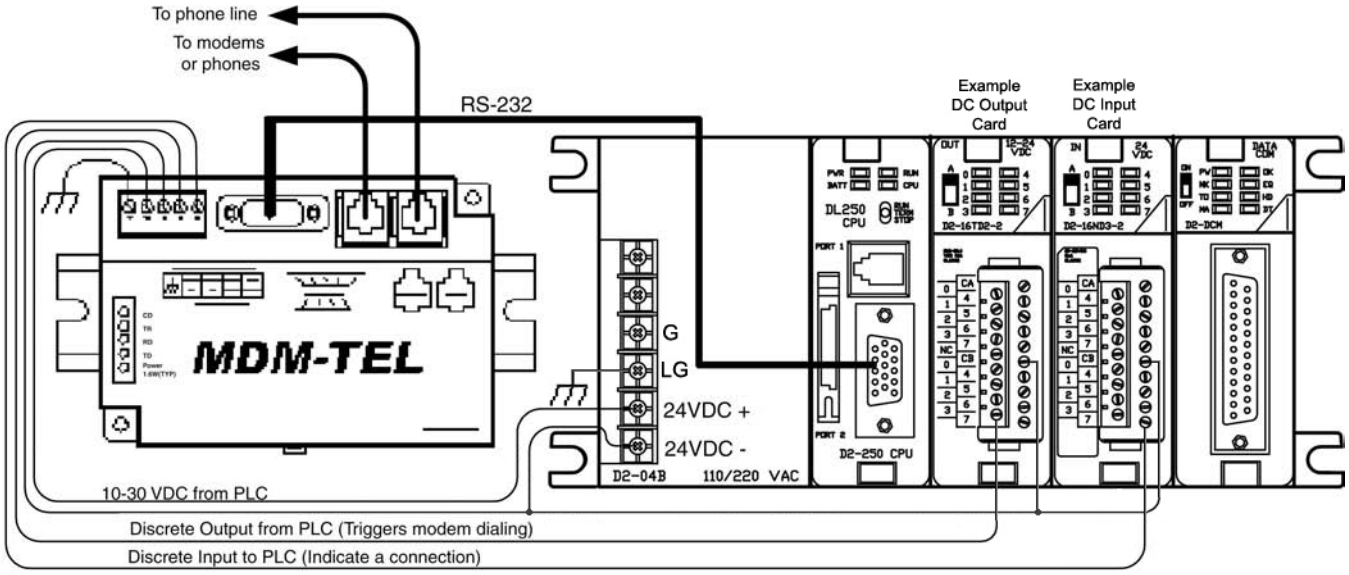


FIGURE 4-3: Industrial Modem Wiring Example

The industrial PLC Self-Dialing Modem has the ability to dial out based on an alarm contact closure or PLC discrete output.

Industrial Contact Initialized Modem

The contact initialized action is triggered by a switch closure or PLC output signal. When the self-dial input is energized, the modem dials a pre-stored phone number and optionally identifies itself by way of a pre-stored ASCII message. Flexible features allow this modem to perform retries or even connect to an alternate number until it has verified that a connection has been established. The call will terminate when either:

- The computer completes its polling and hangs up
- The self-dialing discrete input is turned off
- A telephone line problem disrupts the call.

The contact initialized feature enables field-installed equipment to establish a telephone link based upon a simple switch closure. This modem adds "dial upon alarm" intelligence to any remote site. This modem is ideal for:

DIALING UPON ALARM FROM ANY PLC

This modem establishes a connection based upon a coil output from any PLC. Once a connection has been established, the PLC's system (programming) port is connected to the computer at the other end of the phone link and may be polled by that computer as if the computer had initiated the call. When the modem connects to the central computer, it identifies itself so the computer can run the appropriate I/O driver and interrogate the PLC.

SENDING A MESSAGE BASED UPON A SWITCH CONTACT

Locations that do not have PLCs (or other intelligence) can originate calls to alert you to low tank levels, over temperature conditions, or other alarms. Simply connect the appropriate alarm contact to the modem's input. The modem will dial the pre-stored phone number and deliver a stored ID message to the computer at the receiving end.

SETUP WIZARD

A modem setup utility is provided on the Industrial Modem CD to help you quickly configure the modem. In most applications, no knowledge of modem AT commands or S register contents is necessary. Pre-configured profiles, for common situations, are provided for your convenience.

Section 2 Performance Specifications

Telephone Port	
Max. Data Rate	33.6 kbps (V.34)
Compatibility	V.34, V.32bis, V.32, V.22bis, V.22A/B, V.23, V.21, Bell212A & 103
Data Compression	V.44/V.42bis/MNP 5
Error Correction	V.42/MNP 2-4
Max Fax Modem Rate	14.4 kbps (V.33)
Fax Modem Compatibility	Group 3 (V.33, V.17, V.29, V.27ter, V.21 ch. 2)
Ringer Equivalent	0.3
Line Jack	RJ11
Phone Jack	RJ11
RS232 Port	
Max. RS232 Rate	115.2 kbps (Kilobaud)
RS232 Signal Support	TXD, RXD, CTS, RTS, DCD, DTR, DSR, RI, GND
RS232 Connector	DB9 female, RS232
Command Set	All standard AT and S register commands including Class 1, Class 2 Fax commands and Voice commands
Status LEDs	
CD (Carrier detect)	The modem has detected a carrier on the phone line (a remote modem has been detected).
TR (Data Terminal Ready)	The PC (or Gateway/VersaTRAK) has established a connection to the modem and is ready.
RD (Receive Data)	Flashes as data is received from the phone line.
TD (Transmit Data)	Flashes as data is sent out the phone line.
Power	On when power is present.
General Characteristics	
Input Power	10 - 30 VDC
Input Current Normal / Low Power	97mA @ 24VDC (normal) / 64mA @ 24VDC (low power)
Operating Temperature	-30 ° to 70 ° C
Storage Temperature	-40 ° to 85 ° C
Humidity	5 to 95% RH (non-condensing)
Mounting	DIN rail or panel mount
Dimensions	3.23W x 4.75L x 1.35H inches (8.2 W x 12.1 L x 3.4H cm)
PLC Discrete I/O Interface	
Trigger Input (From PLC)	Connects to PLC output. Starts auto-dialing upon transition from OFF to ON. Modem will stay connected while input is ON.
Voltage Range	9 to 30 VDC
Input Current	6.5mA at 24 VDC
Max. OFF Voltage	5 VDC
On-line Output (To PLC)	Output is ON as long as a connection exists (carrier detect).
Output Characteristics	Sourcing – switches supply power
Max. Output Current	100mA

Section 3 Modem Mounting

This industrial modem snaps onto a standard DIN rail (DIN EN 50022), or can be mounted to a flat panel using #6 or #8 screws. See Figure 3-1. The modem can be installed in any orientation, adjacent to other DIN rail components or in any convenient location within the enclosure. The modem should be installed within 6 feet of the device it will be connected to.

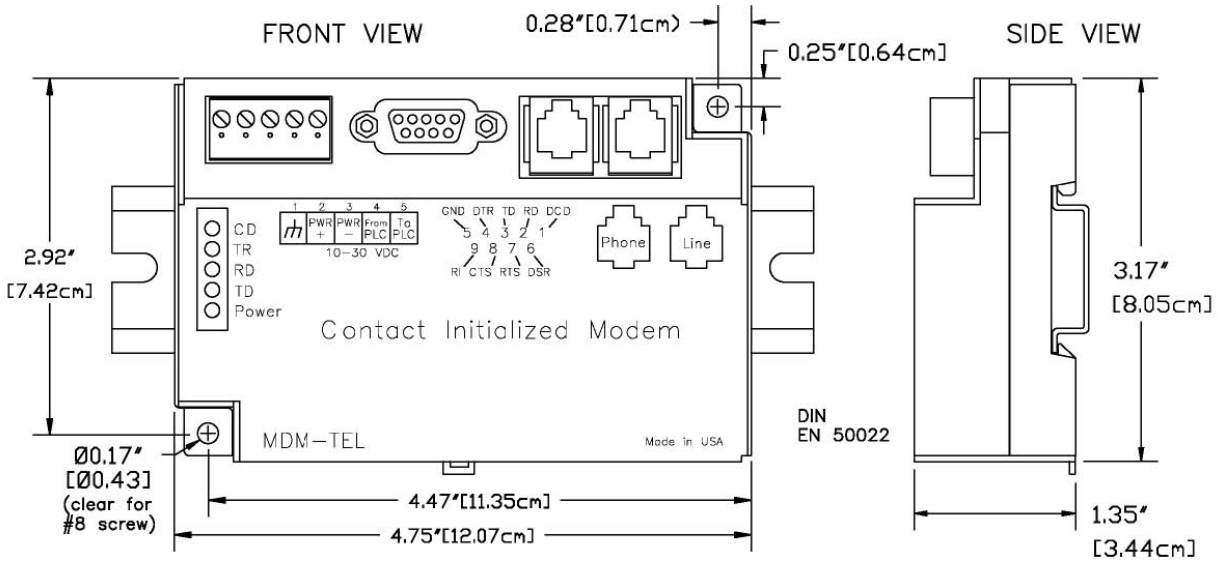


Figure 3-1: MODEM DIMENSIONS

For DIN rail mounting, hook the top, rear of the modem onto the top edge of the DIN rail. Using a small flat head screwdriver, pull down on the spring-loaded tab on the bottom of the modem and push the modem back against the rail. Reverse these steps to remove the modem. See Figure 3-2 below.

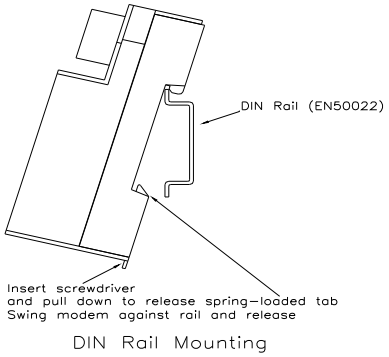

DIN Rail (EN50022)
Insert screwdriver
and pull down to release spring–loaded tab
Swing modem against rail and release
DIN Rail Mounting

Figure 3-2: DIN RAIL MOUNTING

Section 4 Electrical Connections

RS232 Connections:

Use a straight-through or equivalent serial cable to connect the modem's RS232 female port (DB9 cable male end) to the RS232 male port on a PC or other "Data Terminal Equipment" (DTE) device (DB9 cable female end). Figure 4-1 details the pin out of a straight through serial communications cable suitable for connecting a DCE device (MDM-TEL) to a DTE device
(PC, PLC or other device). A suitable DB9 RS-232 cable is provided with the MDM-TEL modem.

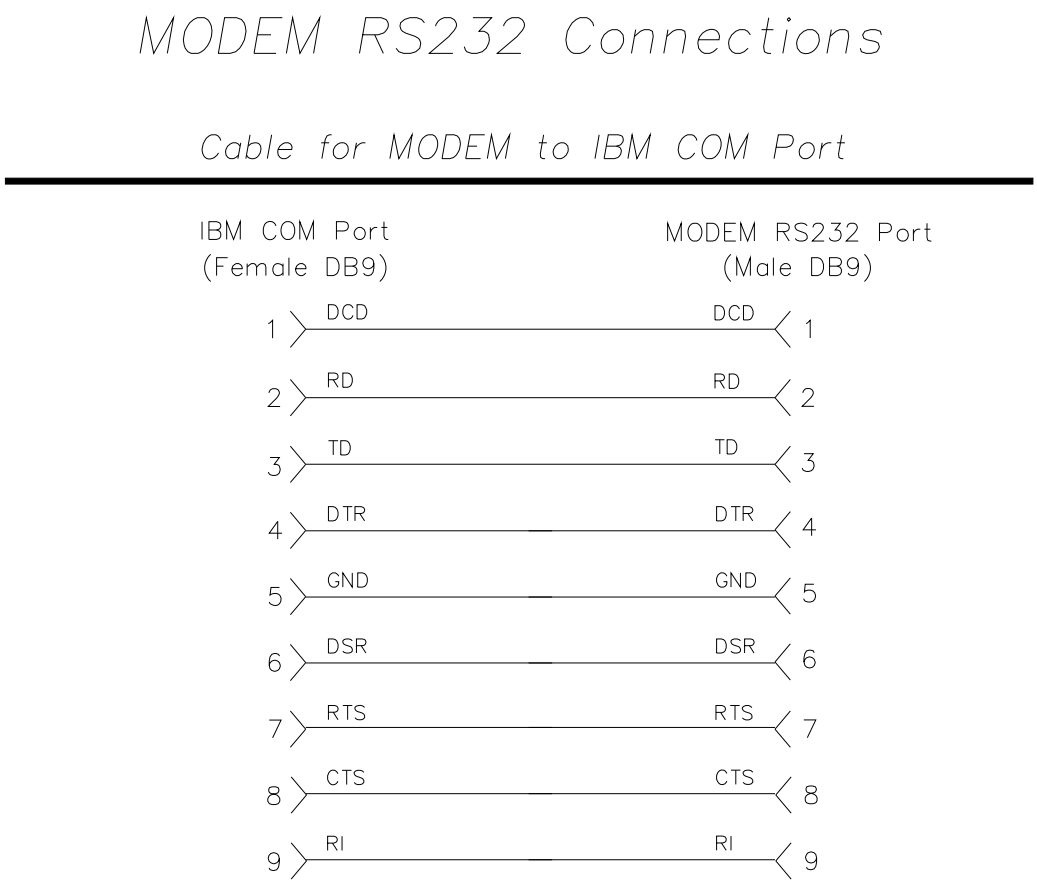


Figure 4-1: MODEM CABLE WIRING

NOTE: A suitable serial cable has been provided with the MDM-TEL. The provided null modem adapter is not required for normal serial communications between the MDM-TEL and a PC.

Automation*Direct* cables for connecting ***Direct***LOGIC PLC's to the MDM-TEL modem are shown in Fig 4-2. The null modem adapter supplied with the modem is required when using these cables. The pinouts for custom cables between ***Direct***LOGIC PLC's and the MDM-TEL modem are detailed in the MDM-TEL Application Note provided on the MDM-TEL CD and available from www.automationdirect.com. For other devices or PLC's, please refer to the product documentation for its cable pinouts.

	DL05	DL06 port 2	D2-240 port 2	D2-250 port 2	D2-DCM	D3-350 port 2	D3-DCM	D4-450 port 1	D4-450 port 2	D4-DCM
D2-DSCBL	X		X						X	
D2-DSCBL-1		X		X						
D3-DSCBL-2					X	X	X	X		X

AutomationDirect does not recommend using modems on ***Direct***Logic ports not listed in the above chart due to telecommunication timing irregularities.

FIG 4-2

NOTE: A null modem adapter **must** be installed on the MDM-TEL for RS-232 communication between a ***Direct***LOGIC PLC and the MDM-TEL modem using the standard Automation*Direct* PLC cables indicated in Fig 4.2. A slim-profile null modem adapter is provided.

Industrial Modem Power, Phone Line, I/O connections:

DC Power Wiring
Connect 10 - 30 VDC to the industrial modem as shown in Figure 4-3. The modem can usually be powered from the same source as other devices in the enclosure. All the screw terminals should be tightened to a maximum of 3.48 in-lbs.

Telephone Cable
Connect analog phone lines to the RJ11 jacks as appropriate. One RJ-11 jack is provided to connect directly to a telephone (optional) and the second RJ-11 jack functions as the connection to the telephone network.

PLC Self-Dial I/O Connections
Connect a 10-30VDC signal to the 'From PLC' (trigger input) terminal. An OFF to ON transition of this signal starts the auto-dialing sequence. The modem will call and remain connected while the signal is ON. When the signal goes false, the modem will terminate the connection or the call in progress.

The 'To PLC' (on-line output) terminal will go ON (ON = user supplied VDC input) when a modem-to-modem connection has been established and the proper 'Acknowledge Message' has been received.

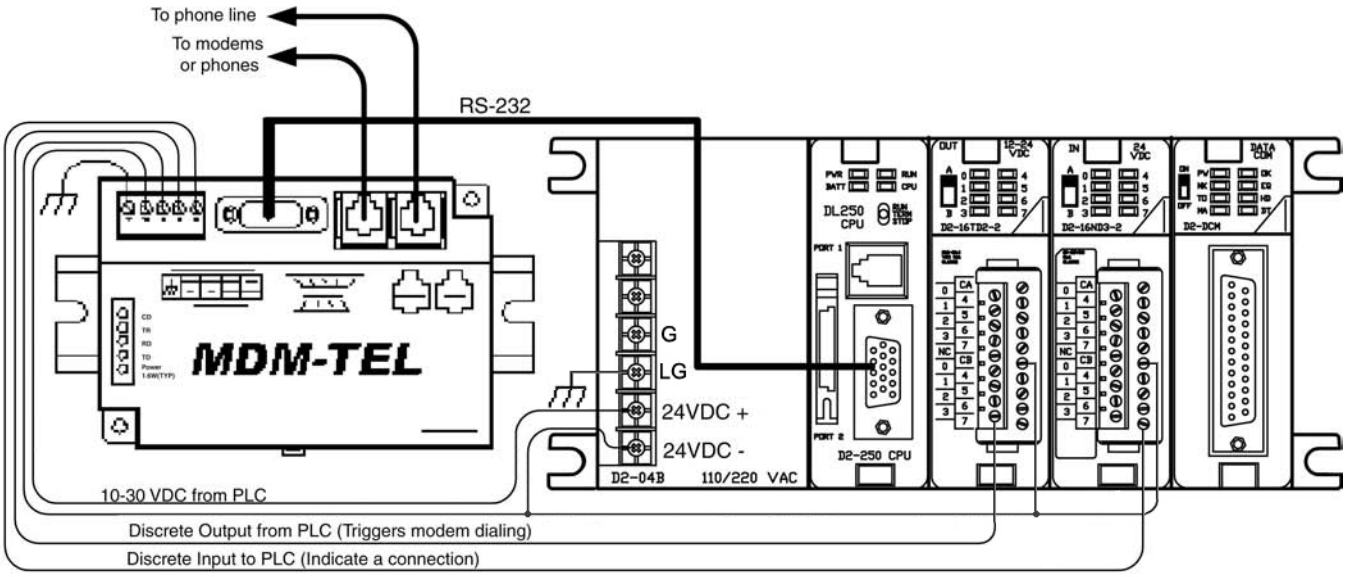


Figure 4-3: INDUSTRIAL MODEM WIRING

Section 5 Modem Configuration

Configuration as an External Modem on a PC:

The Modem can be connected directly to a PC. The modem will need to be "installed" in Windows prior to use. Here are instructions on how to install the modem in Windows 95, 98, NT, 2000 and Windows XP.

Modem Installation in Windows 95/98/NT/2000/XP

Plug and Play method (recommended):

1) With the PC off, connect DC power and the telephone line to the modem. Connect a communications cable (STRAIGHT-THROUGH or equivalent) between the modem and the PC. Turn on the PC. During the boot-up process, Windows should detect the modem and display the New Hardware Found dialog box.
2) Make the selection "Select from a list of alternative drivers".
3) The Select Device dialog will be displayed. In the column labeled Manufacturers, select "Standard Modem Types". In the column labeled Models, select "Standard 28800 bps Modem". Click OK. Windows will then complete the boot-up process. (The standard Windows driver is used for the Industrial Modem. Although the modem supports baud rates to 33,600 bps, the selections in Windows are limited to 28800 bps.)
4) To verify that the modem has been installed, select Start → Settings → Control Panel, and then double click the Modems icon. The modem should be listed as "Standard 28800 bps Modem".

Here is an alternate modem installation procedure (use if the PC is already powered up):

1) Connect the DC power, communications cable (STRAIGHT-THROUGH or equivalent) and telephone line as described above.
2) Select Start → Settings → Control Panel, and then double click the Modems icon.
3) The Install New Modem dialog box will appear. Do not select the "Don't detect my modem, I will select it from a list". Instead, click Next and allow Windows to search the COM ports and detect the modem.
4) Windows should find a modem called Standard Modem. Click Next and Windows will complete installation of the Standard Modem. (Alternately, click Change and select "Standard Modem Types" from the Manufacturers list, and "Standard 28800 bps Modem" from the Models list.)
5) To verify that the modem has been installed, select Start → Settings → Control Panel, and then double click the Modems icon. The modem should be listed as either a "Standard Modem" or a "Standard 28800 bps Modem" depending on the steps followed above.
6) Upon re-booting the machine, Windows may still find the modem as new hardware. If this happens, select "Do not install a driver (Windows will not prompt again)".

Modem Installation in Windows NT

1) Select Start → Settings → Control Panel, and then double click the Modems icon.
2) The Install New Modem dialog box will appear. Do not select the "Don't detect my modem, I will select it from a list". Instead, click Next and allow Windows to search the COM ports and detect the modem.
3) Windows should find a modem called Standard Modem. Click Next and Windows will complete installation of the Standard Modem. (Alternately, click Change and select "Standard Modem Types" from the Manufacturers list, and "Standard 28800 bps Modem" from the Models list.)
4) To verify that the modem has been installed, select Start → Settings → Control Panel, and then double click the Modems icon. The modem should be listed as either a "Standard Modem" or a "Standard 28800 bps Modem" depending on the steps followed above.

Once the MDM-TEL modem has been added to your Windows 95, 98, NT, 2000 or XP system, it is ready for use.

If you are using a PLC or other device, refer to the documentation for that device as necessary.

To Remove a Modem

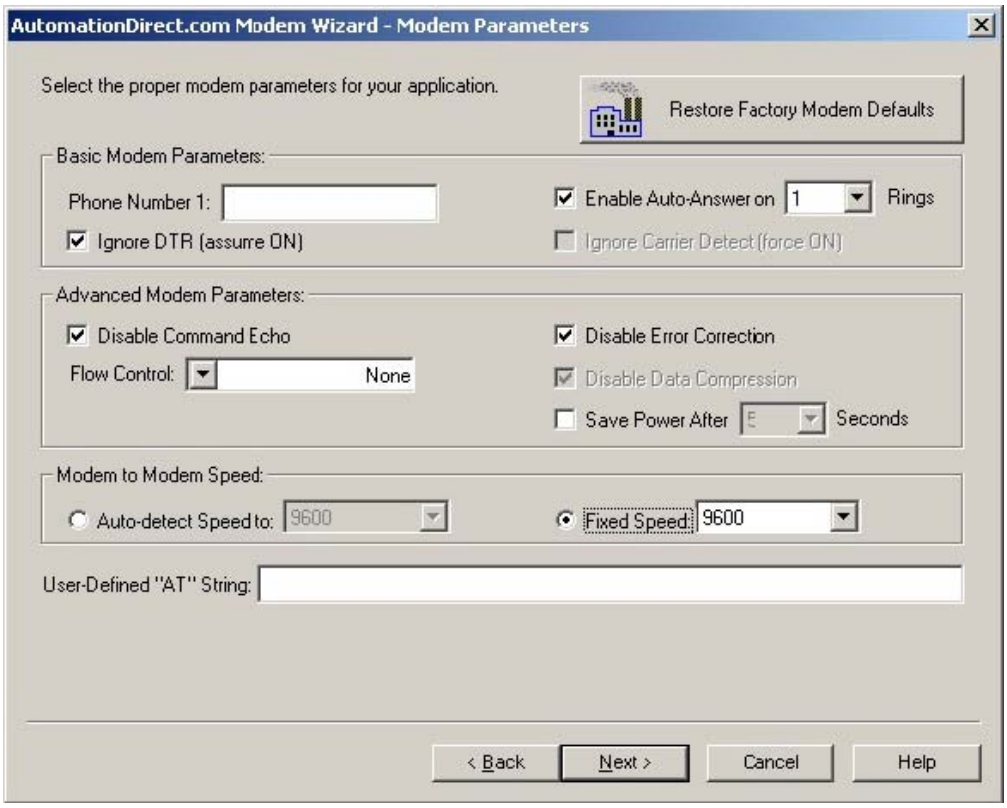
If it ever becomes necessary to re-install the modem for any reason, select Start → Settings → Control Panel, and then double click the System icon. Next, click the Device Manager tab. The list should display a Modems icon. Double click the Modems icon. Highlight the modem to be removed and then click the Remove button. To reinstall the modem, follow the installation steps as previously described.

Configuring Using the Setup Wizard:

It is highly recommended that the Setup Wizard be used for modem configuration. Simply check the appropriate boxes, choose the appropriate communication settings from the drop down lists, and load the configuration into the modem. This utility does not require user knowledge of AT commands and S-registers.

Refer to the online help system in the Setup Wizard for instructions and application notes.

Note:
The Setup Wizard must be used to configure the parameters of the industrial modem. See MDM-TEL application note for details on configuring the MDM-TEL for *Direct*LOGIC PLC's.



Setting the Modem's Serial Port Baud Rate for the PLC

The industrial modem has an automatic baud rate detection feature that lets the modem recognize commands through its serial port at any supported baud rate. When auto-detect is selected, if the modem is connected to a device that does not send commands or data unless spoken to (such as most PLCs), then the modem will pass information from the phone line to its serial port at the last auto-detected baud rate.

The industrial modem is defaulted at the factory for 9600-baud. To change this setting, connect the modem to a PC. Start the Setup Wizard and choose the baud rate that matches the PLC's baud rate. Then choose the appropriate settings and write the configuration to the modem. Exit the Setup Wizard and reconnect the modem to the PLC. (Be sure to cycle power to the modem.) Call the modem and verify that the PLC is responding to commands.

Limiting the Phone Line Connection Speed for Reliability

Typically, when a modem-to-modem connection is established, the two modems negotiate and connect at the fastest possible phone line speed that is within the capability of both modems. The quality of the phone line connection (during the negotiation) will be taken into account. If both modems are of a modern design, the phone line speed can be 33.6K bits per second (or higher, using data compression). Note that this phone line speed is independent of the DTE (serial port) speed, though some older modems require that the phone line speed and DTE speed be the same.

In practice the quality of any phone line changes continually, and frequent data errors may occur. The probability of errors usually increases as the phone line speed increases. Therefore, it is often desirable to restrict the phone line speed to a rate that will provide good performance and yield reliable data. It is also commonplace to restrict the phone line speed to maintain compatibility when replacing an older modem with an industrial modem.

By default, the modem will permit any phone line speed up to 115.2 kbps when data compression is enabled. If you experience intermittent or unreliable communication, try setting the modem-to-modem speed (in the Setup Wizard) to a lower value, to restrict the phone line speed. (Remember to load the new configuration to the modem.)

Industrial Modem Profile Summary

Here is a summary of the active configuration, user profile 0, user profile 1 and the factory defaults when the modem is shipped.

Each time the modem is powered up; first the factory default settings (as listed in Section 6) are loaded into the active configuration. Next, the designated user stored profile is loaded into the active configuration. User profile 0 is loaded by default (see the &Y command in Section 6) and it contains all factory defaults with the exception that it is set to auto answer (register S0=1), and ignore the DTR signal (&D0).

The User profile 1 contains all normal factory defaults (as listed in Section 6).

ACTIVE CONFIGURATION:
B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D0 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0 &Y0
S00:001 S01:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002 S09:006
S10:014 S11:095 S12:050 S18:000 S25:005 S26:001 S36:007 S37:000 S38:020 S44:020
S46: 138 S48:007 S95:000

STORED PROFILE 0:
B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D0 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:001 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S36:007 S37:000 S40:104 S41:195 S46:138 S95:000

STORED PROFILE 1:
B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S36:007 S37:000 S40:104 S41:195 S46:138 S95:000

FACTORY DEFAULTS:
B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S0 &T5 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S36:007 S37:000 S40:104 S41:195 S46:138 S95:000

Section 6 AT Command Summary

The industrial modem supports the AT commands, Fax Class 1 and Class 2 commands listed in this Section. The modem contains a set of factory default settings, which can always be restored by the user. (See the &F command.) The modem also provides two user profiles (profile 0 and profile 1) which hold settings as set and saved by the user. (See the &W command.) The settings currently in use by the modem are generally referred to as the active configuration.

Notes:
The Industrial Modem parameters can only be set using the Setup Wizard, which is provided. Refer to the on-line help in the Setup Wizard for more information.

The following tables only summarize the supported AT commands. The valid parameters and default settings for each AT command are documented in the online help system of the Setup Wizard.

Commands marked with an asterisk (*) have different characteristics, depending on the revision of Self-Dialing modem being used. Refer to the online help system of the Industrial Modem Setup Wizard for the details of these differences.

Command	Function
A/	Re-execute Last Command; do not precede with AT command and do not follow with a carriage return.
A	Go off hook and Answer A Call
AT=x	Write value x to last selected register.
AT?	Report the value of last selected register.
Bn	Set data standard to CCITT(Europe et. al.) or Bell Mode(U.S., Canada) for connections at 300 or 1200 bps.
Cn	Carrier Control (parameter = 1 only)
Dn	Dial (originate a call); typical usage: ATDT5551212 to tone dial number. ATDS=n to dial nth stored number.
E	Echo command to monitor when typed
Fn	Not available.
Hn	Disconnect (Hang up)
In	Identification; reports product code, name, ROM and firmware data, etc.
Ln	Speaker Volume (not available)
Mn	Speaker Control (not available)
Nn	Automode Enable; enabled allows connection at highest possible modem speed, disabled fixes speed according to register S37.
On	Return To On-line Data Mode
P	Set Pulse Dial Default.
Qn	Quiet Results Codes Control; when enabled, result codes are reported to the monitor.
Sn	Establishes S Register n as the last register accessed
Sn-x	Write value x to S Register n.
Sn?	Reports the value of S Register n.
T	Set Tone Dial Default
Vn	Set Result Code Format to terse or verbose.
Wn	Connect Message Control sets the format of the connect messages.
Xn	Extended results code
Yn	Long space disconnect
Zn	Perform Soft Reset and Restore stored user configuration profile 0 or 1.
&Cn	RLSD (DCD) Option; set DCD signal to indicate presence of carrier or forces DCD signal on at all times.

&Dn	DTR Option; set how modem interprets the DTR signal.
&Fn	Restore factory configuration profile 0 or 1.
&Gn	Select guard tone
&Jn	Telephone jack control
&Kn	Set Flow Control
&Mn	Asynchronous/synchronous mode selection
&Pn	Select pulse dial make/break ratio
&Qn	Asynchronous/synchronous mode selection
&Rn	RTS/CTS option sets how the modem controls the CTS signal
&Sn	DSR Override sets how the modem controls the DSR signal
&Tn	Test & diagnostic settings
&V	Display current configuration, stored user profiles and stored telephone numbers
&V1	Display last connection statistics
&Wn	Store current active configuration in one of the two user profiles
&Xn	Select synchronous clock source
&Yn	Designate a default-reset profile. This profile will be active after a hard reset
&Zn=x	Store phone number; n = 0 to 3 and x = dial string
%E	Enable/disable line quality monitor and autoretrain or fallback/fail forward
%L	Report line signal level
%Q	Report line signal quality
%7	Plug and Play Serial Number
%8	Plug & Play Vendor ID, Prod. No.
\Kn	Break Control sets how the modem responds to a break signal
\Nn	Sets the Operating Mode of the modem: direct, normal, reliable or auto reliable
\Vn	Single Line Connect Message Enable
+MS	Select Modulation allows control of the modulation the modem uses to negotiate a connection
+Hn	Enable/Disable RPI and DTE Speed
-SDR	Enable/Disable distinctive ring
**	Download to flash memory
%Cn	Enable/Disable Data Compression (MNP5, V42bis or both)
\An	Select Max MNP Block Size
\Bn	Transmit Break to Remote sets the length of break signal sent to remote modem(in non error correction mode)
)Mn	Enable Cellular Power Level Adjust (only included for compatibility and performs no function)
*Hn	Link Negotiation Speed (only included for compatibility and performs no function)
-Kn	MNP Extended Services
-Qn	Enable Fallback to V.22bis/V.22 (only included for compatibility and performs no function)
-SEC=n	Enable/Disable MNP-EC
@Mn	Initial Cellular Power Level Setting (only included for compatibility and performs no function)
:E	Compromise Equalizer Enable (only included for compatibility and performs no function)
*B	Display Blacklisted Numbers
*D	Display Delayed Numbers
*NCn	Country Select
FAX CLASS 1:	
+FCLASS=n	Service Class
+FAE=n	Data/Fax Auto Answer
+FRH=n	Receive Data with HDLC Framing
+FRM=n	Receive Data
+FRS=n	Receive Silence
+FTH=n	Transmit Data with HDLC Framing
+FTM=N	Transmit Data
+FTS=n	Stop Transmission and Wait

FAX CLASS 2:	
+FCLASS=n	Service Class
+FAA=n	Adaptive Answer
+FAXERR	Fax Error Value
+FBOR	Phase C Data Bit Order
+FBUF?	Buffer Size (Read Only)
+FCFR	Indicate Confirmation to Receive
+FCON	Facsimile Connection Response
+FCIG	Set the Polled Station Identification
+FCR	Capability to Receive
+FCSI:	Report the Called Station ID
+FDCC=	DCE Capabilities Parameters
+FDCS:	Report Current Session
+FDCS=	Current Session Results
+FDIS:	Report Remote Capabilities
+FDIS=	Current Session Parameters
+FDR	Begin or Continue Phase C Receive Data
+FDT=	Data Transmission
+FDTC:	Report the Polled Station Capabilities
+FET:	Post Page Message Response
+FET=n	Transmit Page Punctuation
+FHNG	Call Termination with Status
+FK	Session Termination
+FLID=	Local ID String
+FLPL	Indicate a Document for Polling
+FMDL?	Identify Model
+FMFR?	Identify Manufacturer
+FPHCTO	Phase C Time Out
+FPOLL	Indicates Polling Request
+FPTS:	Page Transfer Status
+FREV?	Identify Revision
+FSPL	Enable Polling
+FTSI:	Report the Transmit Station ID
Caller ID:	
#CID=0	Disable Caller ID
#CID=1	Enable Caller ID with Formatted Presentation
#CID=3	Enable Caller ID with Unformatted Presentation
AudioSpan and DSVD:	
-SMS=	Section AudioSpan/DSVD Mode
-SSE=	Enable/Disable DSVD
-SQS=	Select AudioSpan Modulation
Synchronous Access Mode:	
+ES	Enable/Disable Synchronous Access Mode in the client or central site modem
+ESA	Configures the Operation of the Synchronous Access Submode
+ITF	Selects Transmit Flow Control Thresholds
Voice/Audio:	
#BDR	Select baud rate (turn off autobaud). Enable/Disable RPI and DTE Speed
#CLS	Select data, fax, or voice/audio.
#MDL?	Identify model.
#MFR?	Identify manufacturer.
#REV?	Identify revision level.
#SPK=	Speakerphone Setting

#TL	Audio output transmit level.
#VBQ?	Query buffer size.
#VBS	Bits per sample
#VBT	Beep tone timer.
#VCI?	Identify compression method
#VGT	Set playback volume in the Command State
#VLS	Voice line select
#VRA	Ringback goes away timer (originate)
#VRN	Ringback never came timer (originate)
#VRX	Voice Receive Mode
#VSD	Enable silence deletion (No Function, Command Response Only)
#VSK	Buffer skid setting.
#VSP	Silence detection period (voice receive)
#VSR	Sampling rate selection
#VSS	Silence detection tuner (voice receive)
#VTD	DTMF tone reporting capability
#VTM	Enable timing mark placement
#VTS	Generate tone signals.
#VTX	Voice transmit mode

Section 7 S Register Summary

Note:
The following tables only summarize the supported S-registers.

Register	Function	Range	Units	Default
S0	Number of rings required before modem auto answers	0-255	rings	0
S1	Ring counter increments each time a ring is detected	0-255	rings	0
S2	Escape character	0-255	ASCII	43
S3	Carriage return character	0-127	ASCII	13
S4	Line feed character	0-127	ASCII	10
S5	Backspace character	0-255	ASCII	8
S6	Maximum time to wait after going off-hook to dial when blind dialing	2-255	sec	2
S7	Maximum time to wait for carrier after dialing before hanging up	1-255	sec	50
S8	Pause time for dial delay modifier	0-255	sec	2
S9	Carrier detect response time; duration that carrier must be present for modem to consider it a valid connection	1-255	0.1s	6
S10	Carrier loss disconnect time; carrier must be absent for this time for modem to consider it a lost connection	1-255	0.1s	14
S11	DTMF tone duration	50-255	0.001s	95
S12	Escape prompt delay; this delay must be present after receipt of the last character of the escape sequence(before receipt of any other character) for the escape sequence to be recognized	0-255	0.02s	50
S13	Reserved	-	-	-
S14	General bit mapped options indicates the status of the following options: echo, quiet mode, results codes, tone/pulse and originate/answer	-	-	138(8Ah)
S15	Reserved	-	-	-
S16	Test mode bit mapped options (&T)	-	-	0
S17	Reserved	-	-	-
S18	Test Timer – length of test initiated by Tn command	0-255	s	0
S19	AutoSync Bit Mapped Options	-	-	0
S20	AutoSync HDLC Addr or BSC Sync Char	0-255	-	0
S21	V24/general bit mapped options indicates the status of the following options: CTS(&Rn), DTR(&Dn), DCD(&Cn), DSR(&Sn), long space disconnect(Yn)	-	-	52(34h)
S22	Speaker/results bit mapped options indicates the status of the following options: speaker control(Ln), volume(Mn), results codes(Xn)	-	-	117(75h)
S23	General Bit Mapped Options	-	-	58(3Ah)
S24	Sleep inactivity timer sets the length of time that the modem will operate in normal mode without activity on the phone or RS232 port before entering sleep mode	0-255	s	0
S25	Delay to DTR (CT108) off sets time modem ignores DTR signal before taking action specified by &Dn	0-255	s/0.01s	5
S26	RTS-to-CTS (CT105 to CT106) delay if &R0 is set	0-255	0.01s	1
S27	General Bit Mapped Options for sync/async control(&Mn/&Qn), leased line control(&Ln), clock select(&Xn), Bell/CCITT mode(Bn)	-	-	73(49h)
S28	General Bit Mapped Options indicates options for pulse dialing(&Pn), MNP Link negotiation speed(*Hn)	-	-	0

S29	Flash Modifier Time sets the length of time the modem will go on hook if the flash dial modifier(!) is encountered in the dial string	0-255	10 ms	70
S30	Inactivity timer sets the length of time the modem will remain on line if no data is sent or received	0-255	10s	0
S31	General Bit Mapped Options	-	-	194(C2h)
S32	XON character	0-255	ASCII	17(11h)
S33	XOFF character	0-255	ASCII	19(13h)
S34-S35	Reserved	-	-	-
S36	LAPM Failure Control used when register S48=128	-	-	7
S38	Delay before forced hang-up (time delay between the receipt of H command to disconnect and the actual disconnect operation	0-255	s	20
S39	Flow control bit mapped options	-	-	3
S40	General bit mapped options	-	-	104(68h)
S41	General bit mapped options	-	-	195(C3h)
S42-S45	Reserved	-	-	-
S46	Enable/Disable Data Compression	-	-	138
S48	V.42 Negotiation Control	-	-	7
S82	LAPM Break Control	-	-	128(40h)
S86	Call Failure Reason Code; when the No Carrier result code is issued, the reason for the failure is written to this register	0-255	-	-
S91	PSTN transmit attenuation level	0-15	dBm	10
S92	Fax transmit attenuation level	0-15	dBm	10
S95	Result code messages control	-	-	0

S Register specific bits

S14 General bit mapped options indicates the status of the following options: echo, quiet mode, results codes, tone/pulse and originate/answer

Bit 0 - This bit is ignored.
Bit 1 - Command echo (En)
0 = Disabled (E0)
1 = Enabled (E1) (Default.)
Bit 2 - Quiet mode (Qn)
0 = Send result codes (Q0) (Default.)
1 = Do not send result codes (Q1)
Bit 3 - Result codes (Vn)
0 = Numeric (V0)
1 = Verbose (V1) (Default.)
Bit 4 - Reserved
Bit 5 - Tone (T)/Pulse (P)
0 = Tone (T) (Default.)
1 = Pulse (P)
Bit 6 - Reserved
Bit 7 - Originate/Answer
0 = Answer
1 = Originate (Default.)

S16 Test mode bit mapped options (&T)

Bit 0 - Local analog loopback
0 = Disabled (Default.)
1 = Enabled (&T1)

Bit 1 - Not used
Bit 2 - Local digital loopback
0 = Disabled (Default.)
1 = Enabled (&T3)
Bit 3 - Remote digital loopback (RDL) status
0 = Modem not in RDL (Default.)
1 = RDL in progress
Bit 4 - RDL requested (AT&T6)
0 = RDL not requested (Default.)
1 = RDL requested (&T6)
Bit 5 - RDL with self test
0 = Disabled (Default.)
1 = Enabled (&T7)
Bit 6 - Local analog loopback (LAL) with self test
0 = Disabled (Default.)
1 = Enabled (&T8)
Bit 7 - Not used

S19 AutoSync Bit Mapped Options
Bit 0 - Reserved
Bit 1 - BSC/HDLC format select
0 = BSC selected (Default.)
1 = HDLC selected
Bit 2 - Address detection enable/disable
0 = Disabled (Default.)
1 = Enabled
Bit 3 - NRZI/NZI coding select
0 = NRZI (Default.)
1 = NZI
Bit 4 - Idle indicator select
0 = Mark idle (Default.)
1 = Flag or sync idle
Bits 5 - 7 - Reserved

s21 V24/general bit mapped options indicates the status of the following options: CTS(&Rn), DTR(&Dn), DCD(&Cn), DSR(&Sn), long space disconnect(Yn)
Bit 0 - Set by &Jn command but ignored otherwise.
0 = &J0 (Default.)
1 = &J1
Bit 1 - Reserved
Bit 2 - CTS behavior (&Rn)
0 = CTS tracks RTS (&R0)
1 = CTS always on (&R1) (Default.)

Bits 3-4 - DTR behavior (&Dn)
0 = &D0 selected (Default.)
1 = &D1 selected
2 = &D2 selected
3 = &D3 selected

Bit 5 - RLSD (DCD) behavior (&Cn)
0 = &C0 selected (Default.)
1 = &C1 selected
Bit 6 - DSR behavior (&Sn)
0 = &S0 selected (Default.)
1 = &S1 selected
Bit 7 - Long space disconnect (Yn)
0 = Y0 (Default.)
1 = Y1

S22 Speaker/results bit mapped options indicates the status of the following options: speaker control(Ln), volume(Mn), results codes(Xn)

Bits 0-1 - Speaker volume (Ln)
0 = Off (L0)
1 = Low (L1) (Default.)
2 = Medium (L2)
3 = High (L3)
Bits 2-3 - Speaker control (Mn)
0 = Disabled (M0)
1 = Off on carrier (M1) (Default.)
2 = Always on (M2)
3 = On during handshake (M3)
Bits 4-6 - Limit result codes (Xn)
0 = X0
4 = X1
5 = X2
6 = X3
7 = X4 (Default.)
Bit 7- Reserved

S23 General Bit Mapped Options

Bit 0- Grant RDL
0 = RDL not allowed (&T5) (Default.)
1 = RDL allowed (&T4)
Bits 1-3 - DTE Rate
0 = 0 - 300 bps
1 = 600 bps
2 = 1200 bps
3 = 2400 bps
4 = 4800 bps
5 = 9600 bps (Default.)
6 = 19200 bps
7 = 38400 bps or higher
Bits 4-5 - Assumed DTE parity
0 = even
1 = not used
2 = odd
3 = none (Default.)

Bit 6-7 - Guard tone (&Gn)
0 = None (&G0) (Default)
1 = None (&G1)
2 = 1800 Hz (&G2)

S27 General Bit Mapped Options for sync/async control(&Mn/&Qn), leased line control(&Ln), clock select(&Xn), Bell/CCITT mode(Bn)

Bits 0,1,3 - Synchronous/asynchronous selection (&Mn/&Qn)

3	1	0		
0	0	0	=	&M0 or &Q0
0	0	1	=	&M1 or &Q1
0	1	0	=	&M2 or &Q2
0	1	1	=	&M3 or &Q3
1	0	0	=	&Q4
1	0	1	=	&Q5 (Default.)
1	1	0	=	&Q6

Bit 2 - Leased line control (&Ln)
0 = Dial up line (&L0) (Default.)
1 = Leased line (&L1)
Bits 4,5 - Internal clock select (&Xn)

0 = Internal clock (&X0) (Default.)
1 = External clock (&X1)
2 = Slave clock (&X2)
Bit 6 - CCITT/Bell mode select (Bn)
0 = CCITT mode (B0) (Default.)
1 = Bell mode (B1)
Bit 7 – Reserved

S28 General Bit Mapped Options indicates options for pulse dialing(&Pn), MNP Link negotiation speed(*Hn)

Bits 0-1 - Reserved
Bit 2 - Reserved (always 0).
Bits 3 -4 - Pulse dialing (&Pn)
0 = 39%-61% make/break ratio at 10 pulses per second (&P0) (Default.)
1 = 33%-67% make/break ratio at 10 pulses per second (&P1)
2 = 39%-61% make/break ratio at 20 pulses per second (&P2)
3 = 33%-67% make/break ratio at 20 pulses per second (&P3)
Bit 5 - Reserved
Bits 6-7 - MNP Link Negotiation Speed (*Hn)
0 = Link negotiation at highest speed (*H0) (Default.)
1 = Link negotiation at 1200 bps (*H1)
2= Link negotiation at 4800 bps (*H2)

s31 General Bit Mapped Options

Bit 0 - Single Line Connect Message Enable/Disable (\Vn)
0 = Messages controlled by S95, Wn, and Vn (\V0) (Default)
1= Single Line Connect Message (\V1)

Bit 1 - Controls auto line speed detection (Nn)

0 = Disabled (N0)

1 = Enabled (N1) (Default.)

Bits 2-3 - Controls error correction progress messages (Wn)

0 = DTE speed only (W0) (Default.)

1 = Full reporting (W1)

2 = DCE speed only (W2)

Bit 4-5 Caller ID (#CID)

0= Caller ID Disabled (#CID=0) (Default).

1= Short (formatted) Caller ID enabled (#CID=1).

2= Long (unformatted) Caller ID enabled (#CID=2).

Bits 6-7 - Reserved(default =11b).

S36 LAPM Failure Control used when register S48=128

Bits 0-2 - This value indicates what should happen upon a LAPM failure. These fallback options are initiated immediately upon connection if S48=128. If an invalid number is entered, the number is accepted into the register, but S36 will act as if the default value has been entered.

0 = Modem disconnects.

1 = Modem stays on-line and a Direct mode connection is established.

2 = Reserved.

3 = Modem stays on-line and a Normal mode connection is established.

4 = An MNP connection is attempted and if it fails, the modem disconnects.

5 = An MNP connection is attempted and if it fails, a Direct mode connection is established.

6 = Reserved.

7 = An MNP connection is attempted and if it fails, a Normal mode connection is established. (Default.)

Bits 3-7 - Reserved

S37 Desired Line Connection Speed (when N1 is set)

Bits 0-4 - Desired line connection speed. If an invalid number is entered, the number is accepted into the register, but S37 will act as if the default value has been entered.

0 = Attempt auto mode connection. If N0 is active, connection is attempted at the most recently sensed DTE speed (+MS command settings are updated to the appropriate values. If N1 is active, connection is attempted at the highest possible speed (+MS settings are updated to 11, 1, 300,2880 to reflect V.34, automode, 300 bps minimum speed, and 28800 bps maximum speed). (Default.)

1-3 = Attempt to connect at 300 bps.

4 = Reserved.

5 = Attempt to connect at V.22 1200 bps.

6 = Attempt to connect at V.22 bis 2400 bps.

7 = Attempt to connect at V.23.

8 = Attempt to connect at V.32 bis/V.32 4800 bps.

9 = Attempt to connect at V.32 bis/V.32 9600 bps.

10 = Attempt to connect at V.32 bis 12000 bps.

11 = Attempt to connect at V.32 bis 14400 bps.

12 = Attempt to connect at V.32 bis 7200 bps.

Bits 5-7 - Reserved

S39 Flow control bit mapped options

Bits 0-2 - Status of command options
- 0 = No flow control
- 3 = RTS/CTS (&K3) (Default.)
- 4 = XON/XOFF (&K4)
- 5 = Transparent XON (&K5)
- 6 = Both methods (&K6)

Bits 3-7 - Reserved

S40 General Bit Mapped Options Status

Bit 0 - 1- MNP Extended Services (-Kn)
- 0 = Disable extended services (-K0) (Default for non-MNP 10 models.)
- 1 = Enable extended services (-K1) (Default for MNP 10 models.)
- 2 = Enable extended services (-K2)

Bit 2- Power Level Adjustment for Cellular Use ()Mn)
- 0 = Auto-adjustment ()M0) (Default.)
- 1 = Force adjustment ()M1)

Bits 3-5 - Break Handling (\Kn)
- 0 = \K0
- 1 = \K1
- 2 = \K2
- 3 = \K3
- 4 = \K4
- 5 = \K5 (Default.)

Bits 6-7 - MNP block size (\An)
- 0 = 64 chars (\A0)
- 1 = 128 chars (\A1) (Default.)
- 2 = 192 chars (\A2)
- 3 = 256 chars (\A3)

S41 General Bit Mapped Options Status

Bits 0 -1 -Compression selection (%Cn)
- 0 = Disabled (%C0)
- 1 = MNP 5 (%C1)
- 2 = V.42 bis (%C2)
- 3 = MNP 5 and V.42 bis (%C3) (Default.)

Bit 2, 6- Auto retrain and fallback/fall forward (%En)

Bit 6	Bit 2		
0	0	=	Retrain and fallback/fall forward disabled (%E0) (Default.)
0	1	=	Retrain enabled (%E1)
1	0	=	Fallback/fall forward enabled (%E2)

Bit 3 - Modem-to-modem flow control
- 0 = Disabled (\G0) (Default.)
- 1 = Enabled (\G1)

Bit 4 - Block mode control (\Ln)
- 0 = Stream mode (\L0) (Default.)
- 1 = Block mode (\L1)

Bit 5 - Reserved

Bit 7 - Enable fallback to V.22bis/V.22 (-Qn)

0 = Disabled (-Q0)
1 = Enabled (-Q1) (Default.)

S46 Data Compression Control
S46=136 Execute error correction protocol with no compression.
S46=138 Execute error correction protocol with compression. (Default.)

S48 V.42 Negotiation Control
S48=0 Disable negotiation; bypass the detection and negotiation phases; and proceed with LAPM.
S48=7 Enable negotiation. (Default.)
S48=128 Disable negotiation; bypass the detection and negotiation phases; and proceed at once with the fallback action specified in S36. Can be used to force MNP.

The following table lists the S36 and S48 configuration settings for certain types of connections.

	S48=7	S48=128
S36=0, 2	LAPM or hang up	Do not use
S36=1, 3	LAPM or async	Async
S36=4, 6	LAPM, MNP, or hang up	MNP or hang up
S36=5, 7	LAPM, MNP, or async	MNP or async

S86 Call Failure Reason Code
S86=0 Normal disconnect, no error occurred.
S86=4 Loss of carrier.
S86=5 V.42 negotiation failed to detect an error-correction modem at the other end.
S86=9 The modems could not find a common protocol.
S86=12 Normal disconnect initiated by the remote modem.
S86=13 Remote modem does not respond after 10 re-transmissions of the same message.
S86=14 Protocol violation.

S95 Extended Result Codes
Bit 0 - CONNECT result code indicates DCE speed instead of DTE speed.
Bit 1 - Append/ARQ to CONNECT XXXX result code in error-correction mode (XXXX = rate; see Table 1).
Bit 2 - Enable CARRIER XXXX result code (XXXX = rate; see Table 1).
Bit 3 - Enable PROTOCOL XXXX result code (XXXX = protocol identifier; see Table 1).
Bit 4 - Reserved.
Bit 5 - Enable COMPRESSION result code (XXXX = compression type; see Table 1).
Bit 6 - Reserved.
Bit 7 - Reserved.

Section 8 Maintenance Information

Troubleshooting Tips

Default LED Indications

The Industrial Modem has the following LEDs.

LED	Default Indication
Carrier Detect	This LED will come ON once a phone line connection has been established, and will remain on for as long as the connection is maintained.
Data Terminal Ready	This LED should be ON at all times.
Receive Data	This LED will come ON whenever characters are received through the phone line.
Transmit Data	This LED will come ON whenever the modem sends characters out the phone line.
Power LED	**Normal Indication**: This LED will be ON when power is applied to the modem. **Additional States**: A "Slow" blink indicates an invalid configuration. A "Fast" blink indicates that a self-dial is in process or that the modem is in "Configure Self-dialing Parameters' mode.

Note: The RD and TD LEDs indicate the flow of characters in and out of the phone line interface of the modem, and are not directly connected to the RS232 port.

Reconnecting Serial Cables

It is important to cycle (remove and then reapply) DC power to a modem each time the RS232 cable is disconnected and then reconnected. The serial port of the modem may not function properly if power is not cycled.

Resetting the modem

If it ever becomes necessary to completely reset the modem including both user profiles to the basic factory default settings, the following command can be issued:

AT&F&W&W1 [CR]

This command string will load the factory defaults into the active configuration (&F) and then save those settings into both user profile 0 (&W) and user profile 1 (&W1).

Note that after the modem is reset completely to the factory defaults, it will no longer be set to auto-answer, which is often necessary for the modem to work when connected to a remote device. Use the Setup Wizard to adjust these settings appropriately.

Section 9 Product Support and Additional Documents

FCC Requirements for Consumer Products

The Federal Communications Commission (FCC) has established rules which permit this device to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin lines.

If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until repair has been made. If this is not done, the telephone company may temporarily disconnect service.

If you have problems with your telephone equipment after installing this device, disconnect the device from the line to see if it is causing the problem. If it is, contact your supplier or an authorized agent.

The telephone company may make changes in its technical operations and procedures; if such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes.

If the telephone company requests information on what equipment is connected to their lines, inform them of:

A) The telephone number that it is connected to,
B) The Ringer Equivalence Number 0.3
C) The USOC jack required RJ11, and
D) The FCC Registration Number 34579-MD-E

Items (b) and (d) are indicated on the label. The ringer equivalence number (REN) is used to determine how many devices can be connected to your telephone line, In most areas, the sum of the RENs of all devices on any one line should not exceed five (5.0). If too many devices are attached, they may not ring properly.

In the event of equipment malfunction, all repairs should be performed by our Company or authorized agent. It is the responsibility of users requiring service to report the need for service to our company or one of our authorized agents.

Automation*Direct*.com
3505 Hutchinson Road
Cumming, GA 30040
Phone: (770) 889-2858

Certification Notice for Equipment Used in Canada

The Canadian Department of Communications label identifies certified equipment. This certification means the equipment meats certain telecommunications-network protective, operation, and safety requirements. The Department does not guarantee the equipment will operate to the users satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with single-line individual service may be extended by means of a certified connector assembly (extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility – in this case, your supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. The precaution may be particularly important in rural areas.

Caution:

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician as appropriate.

The LOAD NUMBER (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices, subject only to the requirement that the total of the load numbers of all the devices does not exceed 100.

Federal Communications Commission And Canadian Department of Communications Radio Frequency Interference Statement

Class b Digital Device. This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or telephone reception, which can be determined by turning the equipment on and off. The user is encouraged to try and correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a different circuit from which the receiver is connected.
- Consult an experienced radio/TV technician for help.

Caution:

Changes or modifications not expressly approved by the party responsible for compliance could void the users authority to operate the equipment.

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B device.

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Regulatory Notices

Any European Country:
The Industrial Modem is in conformity with relevant regulatory standards following the provisions of European Council Directives: 73/23/EEC (Low Voltage Directive) and 89/336/EEC amended by 92/31/EEC (EMC Directive).

The Industrial Modem has been approved in accordance with Council Decision 98/482/EC for pan-European single terminal connection to the public switched telephone network (PSTN). However, due to differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN network termination point.

Australia:
The Industrial Modem shall be connected to the Telecommunication Network through a line cord, which meets the requirements of Australian Communications Authority (ACA) Technical Standard TS008. An Australian Approved Power Supply or AC Adapter shall be utilized with the product.

AS/NZS3548:1995-
WARNING: This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate action.

Germany:
Diese als Endeinrichtung vorgesehen und muss an ein TAE mit F-Kodierung angeschlossen werden.
are terminal equipment, which must be connected to the PSTN using an F-coded connector/plug.

IEC950:1991-
The Industrial Modem shall be connected to Telecommunications Network through a line cord approved by the necessary authorities of the country. The Industrial Modem shall be utilized with a power supply approved by the necessary authorities of the country.

United Kingdom:
The Industrial Modem is intended for direct connection to the analogue Public Switched Telecommunications Network and is approved for use within the United Kingdom with following features:
-Modem facility
-Auto calling facility
-Auto answering facility
-DTMF signaling

CAUTION: The analogue telecommunications interface of the modem is intended to be connected to Telecommunication Network Voltage (TNV) circuits, which may carry dangerous voltages. If it is subsequently desired to open the host equipment for any reason, the telephone cord must be disconnected prior to effecting access to any internal parts, which may carry telecommunication network voltages.

Service can be facilitated through our office at:

Automation*Direct*.com
3505 Hutchinson Road
Cumming, GA 30040
Phone: (770) 889-2858